

HIGH WINDS.

[In miles per hour.]

Wind-velocities of fifty or more miles per hour, other than the maximum velocities for the month, which are given in the table of miscellaneous data:

Mount Washington, N. H., 68, nw., 1st; 80, w., 2d; 88, w., 3d; 80, nw., 4th; 68, nw. 5th; 70, sw., 6th; 90, w., 8th; 60, w., 9th; 66, n., 11th; 58, e., 12th; 52, ne., 15th; 50, e., 18th; 80, e. 22d; 88, w., 23d; 80, nw., 24th; 100, nw., 26th; 90, nw., 27th; 80, sw., 28th; 52, se., 29th; 102, nw., 30th; 81, nw., 31st.

Pike's Peak, Colo., 56, w., 1st; 50, nw., 2d; 60, sw., 3d; 60, nw., 6th; 64, w., 8th; 67, sw., 14th; 52, w., 19th; 56, nw., 20th; 56, nw., 23d; 64, nw., 24th; 62, w., 25th; 52, nw., 27th; 62, n., 28th.

Fort Totten, Dak., 52, s., 4th.

Fort Elliott, Tex., 50, nw., 8th.

Fort Maginnis, Mont., 52, w., 10th; 54, nw., 12th; 56, nw., 18th.

Valentine, Nebr., 60, nw., 12th; 54, nw., 19th.

Fort Buford, Dak., 52, nw., 12th.

Fort Assinaboine, Mont., 52, nw., 12th.

INLAND NAVIGATION.

STATE OF WATER IN RIVERS AND HARBORS.

In the following table are shown the danger-points at the various river stations; the highest and lowest depths for March, 1887, with the dates of occurrence, and the monthly ranges:

Heights of rivers above low-water mark, March, 1887.

[Expressed in feet and tenths.]

Stations.	Danger-point on gauge.	Highest water.		Lowest water.		Monthly range.
		Date.	Height.	Date.	Height.	
<i>Red River:</i>						
Shreveport, La.	29.9	19	18.4	31	14.7	3.7
<i>Arkansas River:</i>						
Fort Smith, Ark.	22.0	11	5.6	29, 30, 31	1.7	3.9
Little Rock, Ark.	23.0	9	10.4	31	3.0	7.4
<i>Missouri River:</i>						
Omaha, Nebr.	18.0	28	17.9	24	9.1	8.8
Leavenworth, Kans.	20.0	30, 31	18.2	1	6.6	11.6
<i>Mississippi River:</i>						
Saint Paul, Minn.	14.5	25, 26	7.9	22	6.9	1.0
La Crosse, Wis.	24.0	17	6.3	10	4.5	1.8
Dubuque, Iowa	16.0	13	9.0	26-30	5.8	3.2
Davenport, Iowa	15.0	10, 13	8.4	31	4.7	3.7
Keokuk, Iowa	14.0	16	10.4	2	4.3	6.1
Saint Louis, Mo.	32.0	19, 31	20.0	4	13.0	7.0
Cairo, Ill.	40.0	9, 10	48.6	31	22.1	26.5
Memphis, Tenn.	34.0	10, 11, 13-18	36.4	31	23.6	12.8
Vicksburg, Miss.	41.0	26-31	44.7	1	42.1	2.6
New Orleans, La.	13.0	30	14.7	1, 2	12.9	1.8
<i>Ohio River:</i>						
Pittsburg, Pa.	22.0	8	13.1	25, 27	3.0	10.1
Cincinnati, Ohio	50.0	1	54.6	30	12.9	41.7
Louisville, Ky.	25.0	2	32.0	31	6.4	25.6
<i>Cumberland River:</i>						
Nashville, Tenn.	40.0	2	44.2	30	6.4	37.8
<i>Tennessee River:</i>						
Knoxville, Tenn.		9	11.8	27, 30, 31	2.4	9.4
Chattanooga, Tenn.	33.0	1	27.3	31	5.2	22.1
<i>Savannah River:</i>						
Augusta, Ga.	32.0	10	18.2	27, 28	7.3	10.9
<i>Mobile River:</i>						
Mobile, Ala.		31	17.0	22	14.9	2.1
<i>Sacramento River:</i>						
Red Bluff, Cal.		18	7.0	1	2.1	4.9
Sacramento, Cal.		29	20.5	1, 2, 3	15.5	5.0
<i>Willamette River:</i>						
Portland, Oregon		10	14.1	5	3.0	11.1

a Record for 20 days.

b Record for 21 days.

Mississippi River.—Dubuque, Iowa: on the 10th the ice in the river moved about two hundred feet; on the 12th it began breaking up and moving out rapidly; on this date the transfer steamer "Campbell" made her first regular trip and navigation was considered opened. From the 12th to the 16th large quantities of ice passed down.

Davenport, Iowa: on the 7th the ice in the river opposite the city moved in a mass about one hundred feet, on the 8th about two hundred feet; it began breaking up rapidly on the 9th and 10th and moved down the river slowly. From the 11th to the 14th, inclusive, large quantities of ice passed down. The first boat of the season, the steamer "Wes Rambo," arrived on the 14th.

Keokuk, Iowa: the steamer "Josephine," the first boat of the season, arrived on the 18th.

Cairo, Ill.: the water in the river at this point reached its highest stage on the 9th and 10th, when it was 48.6 feet above the low-water mark; from the 10th until the end of the month it subsided slowly, being 22.1 feet above on the 31st. On the 7th

the Missouri Pacific Railroad trains were shut out from their transfer landing at Bird's Point, Mo., the tracks being covered with water and heavy driftwood.

Memphis, Tenn.: the river remained high throughout the month, reaching its highest stage, 36.4 feet above low-water mark, on the 10th, 11th, 13th, and 18th; this is 0.4 foot higher than any other flood on record at this station. The observer states that from February 16th until March 25th the river was 34.0 feet above the danger-line, but that it did no damage in the immediate vicinity of Memphis, except slightly interrupting traffic and submerging the lower floors of houses.

Missouri River.—Fort Buford, Dak.: the Missouri River at this point remained frozen until the 11th, when the ice below the mouth of the Yellowstone began breaking up. At Rocky Point, Mont., the ice gorged and the river rose thirty-five feet in twelve hours, flooding the warehouse of the Benton Transportation Company, damaging some stores. Above the mouth of the Yellowstone the ice did not break up until the 16th, when it began running out freely, but the water rose rapidly until the 18th, from that date until the end of the month the flood subsided slowly and large quantities of ice passed down.

Leavenworth, Kans.: the water in the river rose steadily from the 1st to 30th, on the latter date and the 31st it remained stationary at 18.2 feet above low-water mark. On the 1st and 2d large quantities of ice passed down. During the remaining days of the month the river at this point was clear of ice, but a considerable amount of driftwood was noted.

At Omaha and Brownville, Nebr., Yankton and Fort Randall, Dak., the ice in the river broke up and commenced floating down on the 12th. On the 22d the river overflowed its banks at Fort Randall and flooded the bottom lands.

Lake Michigan.—Milwaukee, Wis.: the heavy northerly gales of the month drove the ice in the lake southward, and large fields of it still remained in the southern end of the lake at the close of the month. Several vessels left this port on the 30th for Chicago, but were obliged to return, being unable to force a passage through the heavy ice off Racine Point.

Grand Haven, Mich.: the schooner "Jennie Mullen," from Chicago, arrived at this port on the morning of the 10th; this was the first sailing vessel to arrive this season. On the above date the lake was nearly clear of ice, and craft of all kinds were getting ready to leave port at an early date.

Escanaba, Mich.: at the end of the month Little Bay de Noquet and adjacent waters were still covered with three feet of hard ice. The following, from the records of the Signal Office, shows the dates of opening and closing of navigation at this port for the fifteen years from 1872 to 1886:

Years.	Opened.	Closed.	Years.	Opened.	Closed.
1872	April 28	Nov. 30	1880	April 13	Nov. 29
1873	May 2	Dec. 10	1881	May 4	Dec. 5
1874	April 30	Nov. 30	1882	April 1	Dec. 1
1875	May 4	Dec. 1	1883	April 24	Dec. 8
1876	April 27	Dec. 9	1884	April 9	Dec. 9
1877	April 18	Jan. 25, 1878	1885	May 5	Dec. 1
1878	March 5	Dec. 29	1886	April 23	Dec. 6
1879	April 25	Dec. 12			

Lake Erie.—Cleveland, Ohio: the schooner "C. Hutchinson" left this port for the Islands on the 14th; she obtained her cargo and returned, reaching here on the 20th, after having been fast in the ice off this place for several days. On the 28th the steamer "City of Cleveland" arrived from Detroit.

Lake Superior.—Duluth, Minn.: the lake at this point remained frozen solid throughout the month.

Detroit River.—Detroit, Mich.: the ice in the river moved out on the 2d, doing no damage; on the 3d the river was clear.

Hudson River.—Newburg, N. Y.: navigation on the river, between here and New York City, was reopened on the 11th. The steamer "Newburg," of the Homer Ramsdell Transportation Line, left this place at 1 a. m. and reached New York City in four hours. On the above date the river above Newburg was still covered with ice.

FLOODS.

Bismarck, Dak.: on the 16th the ice in the Missouri River at this point broke up and began moving down, but soon formed a gorge at a point about half a mile below the town, and at 3 p. m. the water had risen six feet. On the same day a gorge formed at Washburn, a town forty miles north of Bismarck. During the 17th the greater part of the ice in the Missouri River above the mouth of the Yellowstone began moving, but in the afternoon of the same day it gorged twenty-five miles below Fort Buford and flooded many miles of country. During the night of the 17-18th the gorge at Washburn gave way; in the morning the water began rising rapidly at Bismarck. Although the ice at this point was nearly solid from bank to bank, yet the flow of rapidly rising water broke it into large pieces,

some an acre in extent, forming a gorge at Sibley Island, five miles below the town. The water rose rapidly, overflowing the river banks, and on the afternoon of the 18th the river, which is usually at this point about three-fourths of a mile wide, had increased to five miles. A number of small buildings were carried away, and the telegraph line between Bismarck and Fort Lincoln was completely demolished. About 6,000 acres of meadow land south of Bismarck were covered to a great depth with water and ice flowing at the rate of about six miles per hour. The water continued rising until the 22d; from the 23d until the 26th it fell slowly, on the latter date the gorge at Sibley Island broke and the water receded rapidly. The river attained a greater depth during this flood than it did during the spring flood of 1881, causing great suffering and loss of property to settlers along its banks for miles above the gorge.

Sioux City, Woodbury Co., Iowa: the Missouri River rose rapidly at this point on the 25th, and during the afternoon attained a height but little lower than that of the high water of 1881. At points on the river above this town large areas of bottom lands were overflowed, and considerable damage done.

Yankton, Dak.: the Missouri River at this point reached its greatest height on the 26th, and the water backing into the James River did considerable damage to roads and railways. The track of the Milwaukee Railroad at Burbank, on the Sioux City and Dakota branch, was badly washed and traffic was delayed for several days. After the 26th the water subsided slowly.

Saint Joseph, Buchanan Co., Mo.: the Missouri River at this place overflowed its banks on the 28th and flooded about a square mile of the lowlands on the Kansas side.

ATMOSPHERIC ELECTRICITY.

AURORAS.

The auroral light was reported from very few stations during March, 1887. That which appeared on the night of the 20th-21st was the most extensively observed; it was visible at but one station in New England, Mount Washington, N. H., and one in the upper lake region, Escanaba, Mich., although generally clear weather prevailed in these districts; it was also reported from Saint Vincent, Minn., and two stations in eastern Dakota. The sky over the lower lakes and Ohio and Mississippi valleys was obscured by clouds. This aurora, as it appeared at Saint Vincent, was of a faint white color, and very dim; toward midnight it increased in brilliancy, but shortly after began to fade, and disappeared at 1.30 a. m.

An auroral light of moderate brilliancy was reported from nearly all stations in northern Michigan and one in northeastern Montana on the night of the 19-20th. This display probably extended from the Lake region to eastern Montana, but was obscured over the intervening region by the clouds which covered the sky. The light was most brilliant at Marquette, Mich., where it appeared in the form of a bright white arch, extending from azimuth 145° to 215°, and to an altitude of 45°. Several streamers were visible at 10.30 p. m.; the display disappeared shortly after 11 p. m.

On the night of the 1st-2d an aurora was visible at Tatoosh Island, Wash., but was reported from no other station, although clear weather prevailed over all portions of the country, except Montana, northern Dakota, and parts of the lower lake region and New England. It consisted of a pale white light, extending from 40° north to 55° south of the magnetic meridian, and to an altitude of 8°. At 12.20 a. m. streamers of a bright yellow color shot up to an altitude of 35°; they increased in number and brightness until 12.50 a. m. when the display began to diminish in intensity and had faded away at 1.35 a. m.

On the night of the 23d-24th an aurora was observed at a few stations in northern New England and one in New York. Clear weather prevailed over all parts of the country, except the upper lake region, Minnesota, and Dakota. At Burlington, Vt., it was quite brilliant, and was visible from 10 p. m. of the

23d until 1 a. m. of the 24th. Several streamers flashed up in the northwest at 12.30 a. m. to a height of 20°.

The place of observation and condition of the sky during the remaining displays are as follows:

On the 8th a very faint aurora was observed at Pekin, Ill., and Des Moines, Iowa; clear or fair weather prevailed in all northern sections of the country, except the upper lakes and upper Mississippi valley.

On the 13th, at Fort Totten, Dak., and Cresco, Iowa; sky clear, except in the Lake region and middle Atlantic states.

On the 15th, at Mackinaw City and Alpena, Mich., and Poplar River, Mont.; the sky was clear of clouds over the region lying between these stations.

On the 21st, at North Truro, Mass., and Nashua, N. H.; clear or fair weather prevailed over New England; to the westward as far as Wisconsin the sky was obscured by clouds.

On the 24th, at Gardiner, Me., Oswego, N. Y., Marquette, Mich., and Crete, Nebr.; the sky was clear in all portions of the country, except over the lower lakes and middle Atlantic states.

THUNDER-STORMS.

Thunder-storms occurred in the various states and territories, as follows:

Alabama.—Greensborough, 6th, 20th; Montgomery, 7th; Mobile, 8th, 20th, 31st.

Arizona.—Prescott, 24th.

Arkansas.—Lead Hill, 5th, 19th, 26th, 27th.

Colorado.—Pike's Peak, 19th; Denver, 30th.

District of Columbia.—Washington City, 27th.

Florida.—Archer, 8th, 9th, 17th, 20th, 26th, 27th, 28th; Jacksonville, 8th, 9th, 27th; Pensacola, 8th, 16th, 17th, 20th, 31st; Sanford, 8th, 27th, 28th; Tallahassee, 8th, 27th, 31st; Merritt's Island, 9th, 17th, 25th, 27th; Duke, 9th, 27th; Key West, 12th, 13th, 25th; Cedar Keys, 20th.

Georgia.—Forsyth, 7th; Atlanta, 7th, 27th; Milledgeville, 7th, 28th, 31st; Quitman, 8th, 27th, 31st; Savannah, 28th, 31st.

Illinois.—Charleston, 27th.